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10/563,372	05/09/2006	Christian Uphoff	126501	8831
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BOWERS, NATHAN ANDREW				
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/563,372

**Applicant(s)**

UPHOFF, CHRISTIAN

**Examiner**

NATHAN A. BOWERS

**Art Unit**

1797

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 20 May 2009.  
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-24 is/are pending in the application.  
4a) Of the above claim(s) 19-24 is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 1-18 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
10) ☒ The drawing(s) filed on 09 May 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)  
3) ☒ Information Disclosure Statement(s) (PTO/5508)  
Paper No(s)/Mail Date 040306  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_  
5) ☐ Notice of Informal Patent Application  
6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Election/Restrictions*

1) Applicant's election with traverse of Group I, claims 1-18 in the reply filed on 20 May 2009 is acknowledged. The traversal is on the grounds that all claims 2-24 variously depend on claim 1, and unity of invention has to be considered only in relation to the independent claims. This is not found persuasive because claims 19-24 (Groups II and III) do not necessarily depend on independent claim 1 of Group I. Claim 19 recites a microbiotic mixed culture "*in particular for use* in a bioreactor in accordance with any one of the preceding claims." The term "in particular for use" signals an intended use. Accordingly, the composition of Group II need only be capable of being positioned within the bioreactor of Group I. The composition of Group II does not include any positively recited limitations regarding the structural features set forth in independent claim 1 of Group I. Therefore, there is no shared special technical feature.

Furthermore, in response to the ISPE recitation cited by Applicant, by "dependent claim" is meant not only a claim which contains all the features of another claim, *but also is in the same category of claim as that other claim*. This is not the case in the instant application because Group I is drawn to an apparatus and Group II is drawn to a composition.

The requirement is still deemed proper and is therefore made FINAL.

2) Claims 19-24 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to nonelected inventions, there being no allowable generic or

linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on 20 May 2009.

### ***Specification***

3) The disclosure is objected to because of the following informalities: Applicant refers to specific claims in paragraphs [0001], [0010] and [0027] of the specification. This language needs to be removed because claims may be amended or cancelled over the course of prosecution, thereby rendering these references in the specification inaccurate.

Appropriate correction is required.

### ***Claim Objections***

4) Claim 5 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim, or amend the claim to place the claim in proper dependent form, or rewrite the claim in independent form. Claim 5 recites that the filler body has a "preferably grid-shaped, double wall wherebetween a foam material is arranged." All limitations following the term "preferably" are considered to be optional. Accordingly, claim 5 does not necessarily limit independent claim 1.

5) Claim 7 is objected to because of the following informalities: the acronym "PU" needs to be written out as polyurethane. Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

- 6) Claims 1, 3, 5-11, 16 and 17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
- 7) Regarding claims 1, 5 and 7, the phrase "preferably" renders the claim indefinite because it is unclear whether the limitations following the phrase are part of the claimed invention. See MPEP § 2173.05(d).
- 8) Regarding claims 1, 16 and 17, independent claim 1 recites the limitation "at least one recess." Claims 16 and 17 include limitations additionally drawn to "recesses" and "at least one recess." It is unclear if the recess of claim 1 is the same as the recesses set forth in claims 16 and 17.
- 9) The term "large" in line 5 of claim 1 and in line 2 of claim 6 is a relative term which renders the claim indefinite. The term "large" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. Those of ordinary skill in the art would have differing opinions regarding exactly how extensive a pore diameter must be before it is considered to be large.

Furthermore, microorganisms come in varying diameters and sizes, so a pore diameter that may be "large" for one particular microorganism may not be "large" for other microorganisms.

10) Claim 3 recites the limitation "the liquid surface" in line 2. There is insufficient antecedent basis for this limitation in the claim.

11) Regarding claim 7, the phrase "or the like" renders the claim indefinite because the claim includes elements not actually disclosed (those encompassed by "or the like"), thereby rendering the scope of the claim unascertainable. See MPEP § 2173.05(d).

12) Claim 8 recites the limitation "the strainer basket" in line 8. There is insufficient antecedent basis for this limitation in the claim.

13) Regarding claims 9 and 11, the phrases "e.g." and the phrase "for example" render the claim indefinite because it is unclear whether the limitations following the phrase are part of the claimed invention. See MPEP § 2173.05(d).

14) Claim 10 recites the limitation "the microbiotic mixture" in lines 1 and 2. There is insufficient antecedent basis for this limitation in the claim.

15) Claim 16 recites the limitation "the photocatalytic coating" in line 3. There is insufficient antecedent basis for this limitation in the claim.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

16) Claims 1 and 18 are rejected under 35 U.S.C. 102(b) as being anticipated by Kim (US 6403366).

With respect to claim 1, Kim discloses a bioreactor for the treatment of contaminated fluid. A container (Figure 1:10 and Figure 1:12) is provided and serves to form at least one recess between the upper and lower housing sections. A filler body (Figure 1:16) is positioned within the recess. This is disclosed in column 4, lines 16-29. Column 4, lines 62-67 indicate that the filler body serves to accommodate a microbial mixture.

With respect to claim 18, Kim discloses the bioreactor in claim 1 wherein the filler body is rotatably mounted. This is disclosed in column 3, lines 50-58.

17) Claims 1, 4, 5 and 18 are rejected under 35 U.S.C. 102(b) as being anticipated by Kim (US 6171853).

With respect to claim 1, Kim discloses a bioreactor for the treatment of contaminated fluid. The bioreactor comprises a container (Figure 9:202) including a hollow recess within which a filler body (Figure 9:214) is positioned. This is disclosed in column 4, lines 32-46. Column 3, lines 44-52 states that the filler body is porous and suitable for the growth of microorganisms.

With respect to claims 4 and 5, Kim discloses the bioreactor in claim 1 wherein the filler body (Figure 9:202) comprises a supporting layer on which foam material is applied. Kim teaches in column 3, lines 20-27 that filler is created by sandwiching a central foam material (Figure 4:28) between first and second walls (Figure 4:30). The walls are a mesh and therefore grid-shaped.

With respect to claim 18, Kim discloses the bioreactor in claim 1 wherein the filler body is rotatably mounted. This is disclosed in column 5, lines 1-9.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.



2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

18) Claims 2 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over either Kim (US 6403366) or Kim (US 6171853) each as applied to claim 1, and further in view of Leung (US 6932947).

With respect to claim 2, Kim '366 and Kim '853 each disclose the apparatus set forth in claim 1, however do not expressly state that the filler body is in the form of a spiral. Rather, the Kim references both indicate that the filler body has a cylindrical shape.

Leung discloses a treatment device for the decontamination of a biological fluid. A container (Figure 2A:30) is provided with an inlet (Figure 2A:32) for polluted fluid and an outlet (Figure 2A:34) for treated fluid. As the fluid moves through the container, it encounters a disinfectant filler body (Figure 2A:36) in the shape of a spiral. This is disclosed in column 2, lines 8-22 and column 4, line 56 to column 5, line 5.

The Kim references and Leung are analogous art because they are from the same field of endeavor regarding biofilters for the treatment of contaminated fluids.

At the time of the invention, it would have been obvious to form the filler bodies of Kim '366 and Kim '853 as spirals. Leung teaches that a spiral configuration increases the surface area of the filler body, and therefore increases the effectiveness of the biofilter. The spiral configuration allows for greater contact with the contaminated gas, and therefore results in a higher conversion of pollutants by the biofilter. One of

ordinary skill in the art would have understood how to form the filler bodies of Kim as a spiral, and would have achieved predictable results upon implementation of a spiral filler body.

With respect to claim 3, both Kim '366 and Kim '853 each in combination with Leung disclose the apparatus in claim 2. Although Leung does not expressly state that the spiral-shaped filler body axially increases in diameter, one of ordinary skill in the art would have found it obvious to do this when modifying the Kim references. Leung emphasizes in column 4, line 56 to column 5, line 5 that as the width of the filler body is increased, contact time with the fluid to be treated is increased, thereby improving the effectiveness of the decontamination process. Accordingly, one of ordinary skill in the art would have found it obvious to experiment with the diameters of the Kim filler bodies in order to arrive at the best shape.

Simple changes in shape are not considered to be patentably significant. Furthermore, the selection of a most desirable diameter is considered to be the routine optimization of a result effective variable, and is therefore within the purview of one of ordinary skill. See MPEP 2144.

19) Claims 6 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over either Kim (US 6403366) or Kim (US 6171853) each as applied to claim 1.

With respect to claim 6, Kim '366 and Kim '853 each disclose the apparatus in claim 1. Both Kim references further teach in their respective "Prior Art" sections that

ceramic filler bodies are well known in the art. Accordingly, one of ordinary skill would have been able to achieve predictable results in constructing the Kim filler bodies from a ceramic material. One of ordinary skill would have expected a ceramic material to be compatible with microorganism adhesion and growth, as well as the degradation of a fluid contaminant. One of ordinary skill would have known how to construct a ceramic filler body comprising a large pore size using known techniques.

With respect to claim 17, Kim '366 and Kim '853 each disclose the apparatus in claim 1. Kim '366 further discloses at least one recess (Figure 1:60) at a side end for the passage of liquid. Likewise, Kim '853 discloses at least one recess (Figure 9:210) at a side end for the passage of liquid. Additionally, it would have been obvious to ensure that the containers of both Kim '366 and Kim '853 are cylindrical in shape. The Figures of each reference already depict containers that are approximately cylindrical, and therefore only minor structural alterations would be necessary. A cylindrical container would correspond closely with the filler body, which is each reference discloses as already being cylindrical.

20) Claims 7-9 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim (US 6171853) as applied to claim 4, and further in view of Lasky (US 5817504).

With respect to claim 7, Kim discloses the apparatus in claim 4, however does not expressly indicate that a catalytically active surface is provided on the filler body.

Lasky discloses a contaminant degradation system comprising a container (Figure 3:110) filled with an oxidizing medium (Figure 3:125) comprising microorganisms designed to treat contaminants in a fluid. This is disclosed in column 3, lines 50-60 and generally throughout the reference. Column 3, lines 26-49 and column 5, lines 35-47 state that photoreactive compounds such as titanium dioxide are provided within the oxidizing medium.

Kim and Lasky are analogous art because they are from the same field of endeavor regarding the treatment of a contaminated medium using microorganisms.

At the time of the invention, it would have been obvious to provide the biofilter of Kim with a catalytically active surface using a photoreactive compound such as titanium oxide. Lasky teaches that titanium oxide is beneficial because it serves to accelerate decomposition by activating dormant bacteria.

With respect to claim 8, Kim and Lasky disclose the apparatus in claim 7. As previously noted, Kim additionally indicates that microorganisms are applied to the surface of the filler body.

With respect to claims 9 and 11, Kim and Lasky disclose the apparatus in claims 7 and 8. Kim further states that a carrier substance (Figure 9:206) for accommodating bacteria is in communication with the filler body. This is disclosed in column 4, lines 32-46.

21) Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over either Kim (US 6171853) in view of Lasky (US 5817504) as applied to claim 9, and further in view of Carnes (US 20040067159).

Kim and Lasky disclose the apparatus set forth in claim 8, however do not expressly state that microorganisms are provided with nanoparticles.

Carnes discloses a microbiotic mixture designed to be produced as a spray, gel, or foam capable of degrading contaminants in a waste fluid. Paragraphs [0002] and [0006]-[0010] state that microbiotic mixture contains metal oxide nanoparticles designed to treating unwanted compounds such as chlorocarbons, chlorofluorocarbons, PCBs and toxic industrial chemicals.

Kim and Carnes are analogous art because they are from the same field of endeavor regarding the treatment of contaminated effluent.

At the time of the invention, it would have been obvious to provide the filler body of Kim with metal oxide nanoparticles. Carnes teaches that metal oxide nanoparticles are beneficial because they are effective in treating various hazardous industrial compounds that otherwise would not be degraded by the biofilter. As evidenced by Carnes, the use of nanoparticles in a gel or foam is well known in the art, and, accordingly, one of ordinary skill would have been able to implement nanoparticles in the foam filler body of Kim in a predictable manner.

22) Claims 12-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over either Kim (US 6403366) or Kim (US 6171853) each in view of Leung (US 6932947), and further in view of Lasky (US 5817504).

With respect to claims 12 and 13, Kim '366 and Kim '853 each in view of Leung disclose the apparatus in claim 2, however do not expressly state that the filler body is coated with a photocatalytically active layer.

Lasky discloses a contaminant degradation system comprising a container (Figure 3:110) filled with an oxidizing medium (Figure 3:125) comprising microorganisms designed to treat contaminants in a fluid. This is disclosed in column 3, lines 50-60 and generally throughout the reference. Column 3, lines 26-49 and column 5, lines 35-47 state that photoreactive compounds such as titanium dioxide are provided within the oxidizing medium.

The Kim references and Lasky are analogous art because they are from the same field of endeavor regarding the treatment of a contaminated medium using microorganisms.

At the time of the invention, it would have been obvious to provide each Kim biofilter with a catalytically active surface using a photoreactive compound such as titanium oxide. Lasky teaches that titanium oxide is beneficial because it serves to accelerate decomposition by activating dormant bacteria.

With respect to claims 14 and 15, the Kim references, Leung and Lasky disclose the apparatus set forth in claim 12. Although Lasky does not expressly state that the

photocatalytic layer is applied continuously on the inner surface of the container and in stripes on the outer surface of the container, one of ordinary skill in the art would have known to do this when applying a titanium dioxide layer to the Kim biofilters. Since Lasky teaches that titanium dioxide serves to accelerate the decomposition activity of bacteria, one of ordinary skill would have been motivated to apply a photocatalytic layer in a quantity and in select areas where it would most effectively aid microbial decontamination. It is well within the purview of one of ordinary skill to apply the photocatalytic layer continuously on the container inner surfaces and in strips on the container outer surfaces if it was determined through routine experimentation that application in these areas yielded the best decomposition results.

23) Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over either Kim (US 6403366) or Kim (US 6171853) each as applied to claim 1, and further in view of Lasky (US 5817504) and Scranton Jr. (US 6379433).

The Kim references each disclose the apparatus in claim 1. Leung, as described above, teaches that it is known in the art to provide a photocatalytic coating when degrading contaminants with microorganisms. The combination of each Kim reference with Leung, however, does not expressly state that recesses of the container are punched out to form punching burrs.

Scranton Jr. discloses a biofilter comprising a container (Figure 1:12) and a conduit member (Figure 1:14) each comprising a plurality of recesses. A filler body is positioned within the container in order to remove pollutants from contaminated air. The

treated air is then moved through the conduit member and out of the container. This is disclosed in column 4, line 48 to column 5, line 5. Scranton Jr. teaches in column 5, lines 39-59 that the plurality of recesses are formed by drilling holes through the walls of the container and conduit member.

The Kim references and Scranton Jr. are analogous art because they are from the same field of endeavor regarding biofilter systems.

At the time of the invention, it would have been obvious to form recesses in the walls of the containers disclosed by Kim '366 and Kim '853. As disclosed by Scranton Jr. recesses are beneficial because they allow a contaminated gas to be in fluid communication with a biologically active filler body. Scranton Jr. discloses that recesses are drilled, which is functionally equivalent to punching since both methods inherently produce burrs that project inwardly within a container.

24) Claims 1, 4, 7, 12 and 13 provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 13 and 15 of copending Application No. 12/091008. Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims of the instant application are generic to those of copending Application No. 12/091008. Copending Application No. 12/091008 includes claims drawn to a bioreactor comprising a container, a recess and a filler body (a packing) capable of accommodating a microbotic mixture. The claims of copending Application No. 12/091008 further state that a photocatalytic layer is utilized. However, the claims of copending Application No.



12/091008 include additional limitations that indicate that the filler body is capable of forming a potential difference using a power source.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to NATHAN A. BOWERS whose telephone number is (571)272-8613. The examiner can normally be reached on Monday-Friday 7 AM to 4 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill Warden can be reached on (571) 272-1267. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Nathan A Bowers/  
Examiner, Art Unit 1797